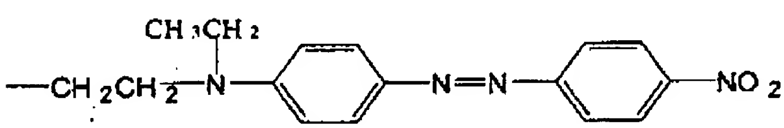
variations and modifications are within the scope of the invention, e.g., as may be within the skill and knowledge of those in the art, after understanding the present disclosure. It is intended to obtain rights which include alternative embodiments to the extent permitted, including alternate, interchangeable and/or equivalent structures, functions, ranges or steps to those claimed, whether or not such alternate, interchangeable and/or equivalent structures, functions, ranges or steps are disclosed herein, and without intending to publicly dedicate any patentable subject matter.

<u>What Is Claimed Is:</u>

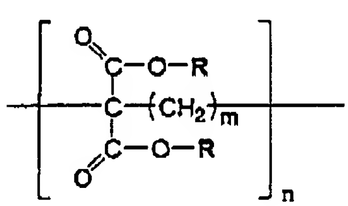
1. A polymer for data storage, in which two of disperse red functional group of Chemical Formula 1 are bonded to repeat unit of the polymer

<Chemical Formula 1>

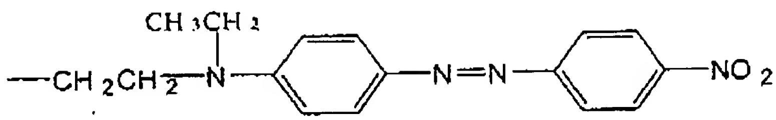


2. The polymer of claim 1, which has the Chemical Formula 2 as follows:

<Chemical Formula 2>



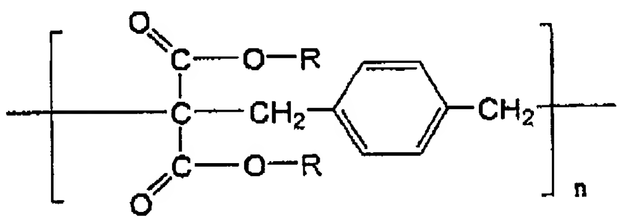
wherein n is an integer; m is 2, 4, 6, 8 or 10; R is the disperse red 1 functional group;



and the average molecular weight of the polymer is in the range of from about 2,000 to 15,000.

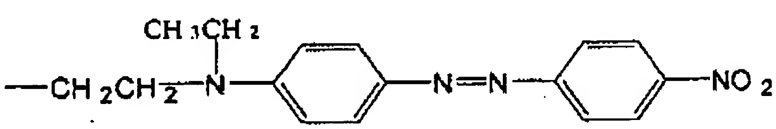
3. The polymer of claim 1, which has the Chemical Formula 3 as follows:

<Chemical Formula 3>



wherein n is an integer; two $-CH_2-$ are bonded to a benzene ring in orto-, meta- or para-position in the above

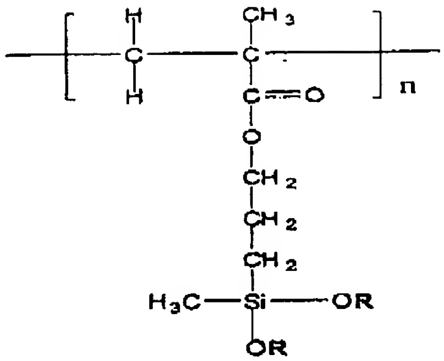
R is the disperse red 1 functional group



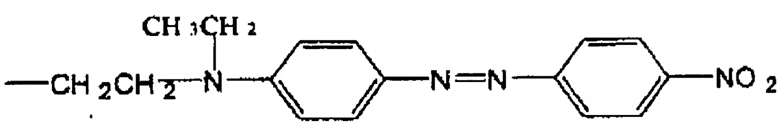
and the average molecular weight of the polymer is in the range of from about 2,000 to 15,000.

4. The polymer of claim 1, which has the Chemical Formula 4 as follows:

<Chemical Formula 4>



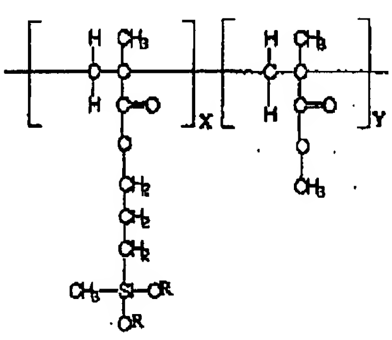
wherein n is an integer; R is



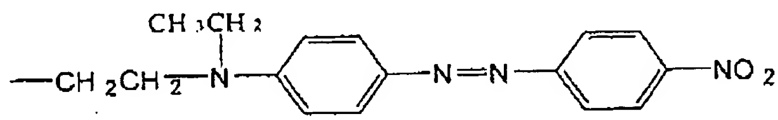
and the average molecular weight of the polymer is in the range of from about 2,000 to 15,000.

5. The polymer of claim 1, which has the Chemical Formula 5 as follows:

<Chemical Formula 5>



wherein R is



the ratio of X:Y is 3~97 mol% : 97~3 mol%; and the average molecular weight of the polymer is in the rage of from about 2,000 to 15,000.

6. A blend copolymer, which consists of 5 ~ 30% of the polymer of claim 2 by weight and 70 ~ 95% of polymethylmetacrylate or polyvinylcabazol by weight.

7. A blend copolymer, which consists of 5 ~ 30% of the polymer of claim 3 by weight and 70 ~ 95% of polymethylmetacrylate or polyvinylcabazol by weight.

8. A blend copolymer, which consists of 5 ~ 30% of the polymer of claim 4 by weight and 70 ~ 95% of polymethylmetacrylate or polyvinylcabazol by weight.

9. A blend copolymer, which consists of 5 ~ 30% of the polymer of claim 5 by weight and 70 ~ 95% of polymethylmetacrylate or polyvinylcabazol by weight.

10. A manufacturing method for a reversible and optical data storage media, which comprises the steps of:

(a) dissolving the polymer of claim 1 into an organic solvent and coating a substrate;

(d) heating the substrate at the polymer's specific melting point; and

(e) cooling the substrate below the glass transition temperature (T_g) to fixate the polymer's isotropic state.

11. A reversible and optical data storage device, which comprises:

an IR laser light source;

an optical lens, on which the irradiated light from the IR light source gets incident;

a first polarizing plate, on which the light from the lens gets incident;

a data storage device, which is coated with the polymer for data storage, being located in the path of the light that passed through the first polarizing plate;

a second polarizing plate, which is located in the path of the light that passed through the media, having polaroid axis perpendicular to that of the first polarizing plate; and

an output device, which outputs the data stored on the media by inputting the light emitted from the second polarizing plate.

12. The device of claim 11, wherein the IR laser light source comprises 847nm Ga/As or 633nm He-Ne.

13. The device of claim 11, wherein the data storage media is positioned at an angle of $(1+n)\pi/4$ (n is 0, 2, 4 or 6) with the polarization axis of the first polarizing plate and that of the second polarizing plate, respectively.

14. A reversible and optical data storage method, which comprises the steps of:

(a) coating a substrate with the polymer of claim 1;

(b) heating the coated substrate at a temperature higher than the employed polymer's melting point in order to arrange the substrate in the isotropic state to form a data storage media by cooling the same below the glass transition temperature (T_g) of the polymer employed;

(c) recording digital data in the data storage media by passing through the polarized light that was irradiated from Ar ion laser light source a first polarizing plate, an optical attenuator and a wave plate successively;

(d) reading the digital data by inputting the digital data to an output device after passing the polarized light irradiated from an IR laser light source through an optical lens, a second polarizing plate, the data storage media, and finally a third polarizing plate which has a polarization axis perpendicular to that of the second polarizing plate;

(e) erasing the recorded and read digital data from the data storage media; and

(f) rewriting and re-reading new data by repeating the steps of (c), (d) and (e) in the data storage media.

15. A reversible and optical analogue data storage method, which comprises the steps of :

(a) coating a substrate with the polymer of claim 1;

(b) heating the coated substrate at a higher temperature than the polymer's melting point in order to arrange the substrate in the isotropic state to form a data storage media by cooling the same below the glass transition temperature (T_g) of the polymer employed;

(c) recording analogue data in the data storage media by passing through the polarized light that was irradiated from Ar ion laser light source a first polarizing plate, an optical attenuator and a wave plate successively;

(d) reading the analogue data by inputting the analogue data to an output device after passing the polarized light irradiated from an IR laser light source through an optical lens, a second polarizing plate, the data storage media, and finally a third polarizing plate which has a polarization axis perpendicular to that of the second polarizing plate;

(e) erasing the recorded and read analogue data from the data storage media; and

(f) rewriting and re-reading new data by repeating the steps of (c), (d), and (e) in the data storage media.

16. The reversible and optical data storage method of claim 15, which employs a low output optical polarizing microscope in which the second and the third polarizing plates are attached perpendicular to each other for the analogue data read step (d).

17. The method of claim 14, wherein the media storage media is placed at an angle of $(1+n)\pi/4$ (n is 0, 2, 4 or 6) with the polarization axis of the second polarizing plate and that of the third polarizing plate, respectively.

18. The method of claim 15, wherein the media storage media is placed at an angle of $(1+n)\pi/4$ (n is 0, 2, 4 or 6) with the polarization axis of the second polarizing plate and that of the third polarizing plate, respectively

19. The method of claim 14, in which the step (f) is carried out by erasing the data in the data storage media by passing the circular polarized light through the media, which was emitted from the wave plate having $\lambda/4$ wave length when the wave plate in the step (c) has $\lambda/2$ wave length.

20. The method of claim 15, in which the step (f) is carried out by erasing the data in the data storage media by passing the circular polarized light through the media,

which was emitted from the wave plate having λ/4 wave length when the wave plate in the step (c) has λ/2 wave length.

21. The method of claim 14, in which the step (f) further comprises a data erase step by heating the media at a higher temperature than the melting point of the polymer employed.

22. The method of claim 15, in which the step (f) further comprises a data erase step by heating the media at a higher temperature than the melting point of the polymer employed.